

ABSTRACT

The present invention features a fluid flow regulator that functions to significantly influence fluid flow across an airfoil or hydrofoil, as well as various rotating or rotary devices, including propellers, impellers, turbines, rotors, fans, and other similar devices, as well as to significantly effect the performance of airfoils and hydrofoils and these rotary devices subjected to a fluid. The fluid flow regulator comprises a pressure recovery drop that induces a sudden drop in pressure at an optimal pressure recovery point on the surface, such that a sub-atmospheric barrier is created that serves as a cushion between the molecules in the fluid and the molecules at the airfoil's or hydrofoil's surface. More specifically, the present invention fluid flow regulator functions to significantly regulate the pressure gradients that exist along the surface of an airfoil or hydrofoil. Regulation of pressure gradients is accomplished by selectively reducing the pressure drag at various locations along the surface, as well as the pressure drag induced forward and aft of the airfoil or hydrofoil, via the pressure recovery drop. Reducing the pressure drag in turn increases pressure recovery or pressure recovery potential, which pressure recovery subsequently lowers the friction drag along the surface. By reducing or lowering friction drag, the potential for fluid separation is decreased, or in other words, the separation and separation potential of the fluid is significantly reduced.